CONTINUOUS HANDICAP THRESHOLD ASSEMBLY WITH DUAL DAMS AND SELECTIVELY POSITIONABLE SIDELIGHT CAP

TECHNICAL FIELD

This invention relates generally to threshold assemblies for installation in entryways of buildings and more specifically to handicap threshold assemblies configured to be easily traversable by a wheelchair.

BACKGROUND

A threshold assembly is that portion of an entryway system that underlies the door and, in many instances, one or more sidelights or side panels that flank the door. Threshold assemblies have evolved significantly over the past few decades from wooden thresholds, to thresholds formed of simple static aluminum extrusions, to complex modern threshold assemblies, which usually incorporate extruded aluminum portions with adjustable threshold caps and sophisticated water shedding and sealing mechanisms. In the case of entryways with sidelights, modern threshold assemblies are designed to be continuous; that is, to extend continuously without breaks beneath the door, sidelights, and mull posts that separate them. Such continuous sidelight sills reduce significantly the leakage problems common in older "box" construction sidelight entryways, wherein separate threshold sections underlie the door and sidelights. The same is true of patio door entryways, wherein a pair of doors are mounted in an entryway with one door being fixed and the other being hinged for opening and closing. Thus, whenever the terms sidelight entryway, sidelight sill, sidelight cap, and terms of similar import are used herein, it will be understood that the discussion also is equally applicable to patio door entryways and, in fact, to any door unit having a fixed panel and a hinged door.

While modern threshold assemblies function substantially better than their older counterparts, they nevertheless have not generally been designed with the handicapped or otherwise wheelchair bound person in mind. For example, their height and profile oftentimes present difficult or impossible barriers to a handicapped person wishing to enter a building in a wheelchair. In many instances, the thresholds can only be traversed with the help of another, which is inconvenient and can even be embarrassing or degrading to the handicapped individual.

While threshold assemblies adapted to be traversed by a wheelchair have been developed, and standards to handicap thresholds are set forth in the Americans with Disabilities Act (ADA) the evolution of handicap thresholds has generally not kept pace with that of standard threshold assemblies. For example, many handicap threshold assemblies fail to incorporate the water sealing technologies of standard assemblies and are thus susceptible to leaks between the threshold and a closed door, particularly during driving or wind blown rains. Further, currently available handicap thresholds are not designed to accommodate entryways with sidelight panels, which nevertheless are popular and common architectural features. In cases where a handicapped accessible entryway includes sidelights, door manufacturers have been left with the old box method of accommodating the sidelights, which, as mentioned above, leads to leaks and also to increased manufacturing complexity.

Thus, a need exists for a handicap threshold assembly that incorporates the leak resistance of modern standard threshold assemblies, that easily accommodates entryways with

sidelight panels, and that also meets ADA standards for easy traversal by an individual in a wheelchair. It is to the provision of such a threshold assembly that the present invention is primarily directed.

SUMMARY OF THE INVENTION

Briefly described, the present invention, in one preferred embodiment thereof, comprises a continuous handicap threshold assembly for installation beneath the door and sidelights of an entryway system. The threshold assembly comprises an elongated preferably extruded aluminum body having a threshold portion for underlying a closed door, an exterior sill that extends outwardly and slopes downwardly from the threshold portion, and an interior sill that projects in the opposite direction from the threshold portion. The body is profiled to extend a maximum of one-half inch above the floor in order to meet ADA standards and to be easily traversable by an individual in a wheelchair.

The threshold portion of the assembly projects upwardly a relatively small distance from the exterior and interior sills to define dams that extend along the junction of the sills and the threshold portion. These dams form barriers that prevent the leakage of rainwater across the threshold portion and into a building. Exterior and interior lips project a short distance horizontally from the tops of the dams so that each dam and its lip define a detent or groove that extends along the length of the threshold body.

The threshold assembly of this invention is particularly suited for use with an entryway having an openable door flanked by a fixed panel such as one or two sidelights. When used with such an entryway, the body of the assembly extends continuously beneath both the door and the sidelight panels. Sidelight caps, preferably formed of extruded plastic material, are configured to fit atop the threshold body in the regions that underlie each of the sidelight panels. Each sidelight cap is configured to snap into place on the body overlying the threshold portion thereof and to receive, support, and seal against a sidelight panel resting on the cap. In this regard, each sidelight cap is formed with an elongated horizontal upper surface supported along each edge by a pair of depending legs. The cap has a width greater than the width of the threshold portion of the body and is configured to cover the threshold portion in a region that underlies a sidelight panel. A pair of tabs project inwardly from the bottoms of each depending leg and the tabs are sized and configured to be received in respective ones of the grooves formed by the dams and lips. Thus, each threshold cap can be snapped into place on the body covering the threshold portion in the region of a sidelight panel. Further, the sidelight caps can be cut to length easily and selectively positioned at any desired location along the threshold body. The threshold assembly is therefore fully adaptable to any fixed panel/openable door entryway, whether it be a double sidelight entryway, a left hand sidelight entryway, a right hand sidelight entryway, or a patio door entryway.

Accordingly, a continuous handicap threshold assembly is now provided that successfully addresses the problems and shortcomings of the prior art. The assembly meets ADA standards; incorporates dual dams to prevent migration of rainwater; extends continuously beneath both the door and its sidelights, thereby eliminating the need for the box construction used in the past; and includes selectively positionable sidelight caps to accommodate virtually any sidelight or patio door entryway configuration. These and other features and advantages will become more apparent upon review of the detailed description set forth below, when

taken in conjunction with the accompanying drawing figures, which are briefly described as follows.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view of a handicap threshold assembly that embodies principles of the invention and that is designed for use with an inswing entryway.

FIG. 2 is a cross sectional view of a handicap threshold assembly embodying principles of the invention and designed for use with an outswing entryway.

FIG. 3 is a cross-sectional view of the inswing threshold assembly of FIG. 1 illustrating use of the selectively positionable sidelight cap to support a sidelight panel.

FIG. 4 is an enlarged cross-sectional view of a coextruded flexible fin on the support surface of the sidelight cap for sealing against the bottom of a sidelight panel.

FIG. 5 is a cross-sectional view of the outswing threshold assembly of FIG. 2 illustrating use of the selectively positionable sidelight cap to support a sidelight panel.

FIG. 6 is a cross-sectional view of an alternate embodiment of a handicap threshold assembly and sidelight cap.

FIG. 7 is a front plan view of a single sidelight entryway that incorporates the threshold assembly of this invention.

FIG. 8 is a perspective view of the threshold assembly of FIG. 3 illustrating placement of the sidelight cap on the threshold body.

DETAILED DESCRIPTION

Referring now in more detail to the drawings, in which like numerals refer to like parts throughout the several views, FIG. 1 is a cross-sectional view of a threshold assembly that embodies principles of the invention and that is configured for use with an inswing door. The threshold assembly 11 comprises an elongated body 12, which preferably is formed of extruded aluminum but that also may be formed of an alternate material such as plastic or composites. The body 12 is profiled to define a threshold portion 13 having an upper surface 14 positioned to underlie a closed door 16 mounted within a door frame 19. In the illustrated embodiment, the door 16 is provided with a flexible sweep 17 extending along the bottom edge of the door. Conventionally, the sweep 17 has depending flexible fins 18, some of which engage and seal against the threshold portion 13 and some of which are positioned and oriented to shed water away from the bottom of the door. The particular configuration of the door and sweep shown in FIG. 1, and, for that matter, in some of the other figures, is exemplary only and is shown to illustrate the invention better. Many types of doors and sweeps are available and may be used with the threshold assembly of this invention.

The threshold assembly is further profiled to define an exterior sill 21 that projects outwardly and slopes downwardly from the threshold portion 13 of the assembly. The sill 21 is supported by a forward sill support 22, which also forms a caulking groove 23, and a rear sill support 24, which also forms a screw boss 26 for attaching the threshold assembly to the bottoms of the vertical jambs of a door frame with the threshold assembly extending between the jambs. The sill 21 extends from the threshold portion to an exterior edge 27, which is down-turned to engage a support surface. A relatively short interior sill 28 extends from the other side of the threshold portion 13 to a down-turned interior edge 29, which preferably is formed with an in-turned foot 31, which rests upon a support surface to support the interior sill 28.

The threshold portion 13 of the assembly projects slightly upwardly from the exterior sill 21 to form an exterior dam 32 that extends along the length of the body 12 at the junction of the threshold portion and the exterior sill. Similarly, the threshold portion also projects slightly upwardly from the interior sill 28 to form an interior dam 33. The dual dams 32 and 33 form barriers against the migration of water from the sills across the threshold portion of the assembly. This is particularly important in the case of the exterior dam 32 because in many installations the exterior sill 21 is exposed to rain and also receives runoff rain from the exterior surface of the door 16. Even though the exterior sill 21 is sloped downwardly, its slope is slighter than that of a conventional threshold assembly in order to provide easy traversal by a wheelchair. Accordingly, even a slightly windblown rain can cause water to be blown up the sill toward the threshold portion of the assembly. The exterior dam 32 encounters and stops the water.

An exterior overhang or lip 34 projects outwardly from the top of the exterior dam 32 and the lip 34 and dam 32 together form an exterior groove that extends along the length of the threshold assembly. Similarly, an interior lip 36 projects from top of the interior dam 33 and, together with the dam 33, forms an interior groove that also extends along the length of the threshold assembly. The exterior and interior grooves enhance the function of the dams 32 and 33 in preventing water seepage under a closed door. The grooves also provide means for mounting one or more sidelight caps or a fixed patio door to the threshold assembly, as described in more detail below.

Conventionally, a thermal break 37 is provided along the length of the threshold assembly 11 in the region of the threshold portion 13. The thermal break 37 is formed by a thermally insulating material 38 that joins interior and exterior portions of the threshold assembly to form a monolithic structure. Where the sill is formed of extruded aluminum, the thermal break 37 prevents condensation on interior portions of the assembly in cold weather by thermally insulating the interior portion from the exposed exterior portion. Support legs 39 project downwardly on either side of the thermal break 37 to provide support for the threshold portion 13 of the assembly and to prevent undue mechanical stress on the thermal break during use of the threshold assembly.

FIG. 2 illustrates similar principles of the invention in the form of a handicap threshold assembly for use with an outswing door. Here, the handicap threshold assembly 41 has an elongated preferably extruded aluminum body 42 with an upwardly projecting generally centrally located threshold portion 43 having an upper surface 44 positioned to underlie a closed door 46 mounted within a door frame 49. As with the prior embodiment, a sweep 47 having depending flexible fins 48 is mounted to and extends along the bottom edge of the door 46 for sealing against and shedding water away from the threshold portion 43.

An exterior sill 51 extends outwardly and slopes slightly downwardly from the threshold portion 43 to an exterior edge 52. An interior sill 53 extends from the other side of the threshold portion 43 and slopes downwardly to a down turned interior edge 54. The interior sill is supported on a support 56, which is also formed to define a screw boss 57. A thermal break 63 formed of thermally insulating material 64 bridges a gap between the interior and exterior portions of the body 42 to prevent condensation on interior portions of the assembly during cold weather. The upper surface 44 of the threshold portion preferably slopes slightly downwardly toward the exterior sill 51 to help shed any water that may collect on the threshold portion.

The threshold portion **43** projects upwardly from the exterior and interior sills **51** and **53** respectively to form an exterior dam **58** and an interior dam **59**, similar to the dams of the embodiment of FIG. **1**. An exterior lip **61** projects from the top of the exterior dam **58** to define with the dam a longitudinally extending groove along the junction between the exterior sill **51** and the threshold portion **43**. Similarly, an interior lip **62** projects from the top of the interior dam **59** to form a longitudinally extending groove along the junction of the interior sill **53** and the threshold portion **43**. These grooves are sized to receive one or more sidelight caps mounted to the threshold assembly in sidelight door installations, as detailed below.

The inswing threshold assembly **11** of FIG. **1** and the outswing threshold assembly **41** of FIG. **2** are each configured to meet ADA standards as handicap thresholds. In this regard, each of the threshold assemblies projects upwardly from its support surface no more that one-half inch. Further the slope of the exterior and interior sills is slight, which allows an individual in a wheelchair to traverse the threshold assemblies with ease and without the help of another. As mentioned above, the dual dams of the threshold assemblies help compensate for the slight slopes of the sills, which otherwise can lead to water leakage, particularly during wind-blown rains. The dams of the present invention provide a positive barrier to windblown rain and prevent leakage from either of the sills past the threshold portions of the assemblies.

The handicap threshold assemblies of the present invention are particularly suited and configured for use with entryways having an openable door with one or more flanking fixed panels such as a patio door or a sidelight panel. In such installations, the threshold assemblies extend continuously beneath both the door of the entryway and the fixed panels. A continuous sill in these situations greatly reduces leakage common in old box style sidelight construction, and also simplifies the manufacturing process. FIGS. **3** through **6** illustrate, in various embodiments, the threshold assembly of this invention with sidelight caps for use with sidelight entryway systems. These illustrated embodiments also apply to patio door entryways.

In FIG. **3**, an inswing threshold assembly **80** is illustrated with the included sidelight cap **71** supporting a sidelight panel **81**. The threshold assembly **80** includes the extruded aluminum body **12** of FIG. **1**, which includes a threshold portion **13** with an upper surface **14**, an exterior sill **21**, and an interior sill **28**. Dams **32** and **33** with their projecting lips **34** and **36** from exterior and interior grooves extending along the junctions of the exterior and interior sills respectively with the threshold portion of the assembly.

A sidelight cap **71** is mounted atop the body **12** of the assembly for receiving and supporting a sidelight panel **81**, which generally is located on one side of the door of an entryway. The sidelight cap **71**, preferably formed of extruded or co-extruded plastic, has a generally horizontal support surface **72** supported above the threshold portion **13** on a vertically extending exterior leg **73** and a vertically extending interior leg **74**. An exterior tab **76** projects inwardly from the bottom of the exterior leg **73** and an interior tab **77** projects inwardly from the bottom of the interior leg **74**. The exterior tab **76** rests on the external sill **21** and is sized to extend into the groove formed by the dam **32** and lip **34** at the junction of the exterior sill and threshold portion. Similarly, the interior tab **77** rests on the interior sill **28** and extends into the groove formed by the dam **33** and tab **36** along the junction between the interior sill **28** and the threshold portion. A raised stop **78** is formed along the interior side of the support surface **72** for abutting and positioning the sidelight panel **81**. The raised stop **78** also forms a barrier against migration of water under the sidelight panel and into a building. Score lines **86**, **87**, and **88** are formed along the exterior tab **76**, the interior tab **77**, and the raised stop **78** respectively for purposes described in more detail below.

The sidelight cap **71** preferably is co-extruded with a relatively rigid high durometer plastic body for supporting the weight of a sidelight panel and a relatively softer low durometer plastic skin **79** at selected critical locations on the cap. The sidelight cap is further formed with flexible fins at key locations on the cap for providing seals against the migration of water. Specifically, a flexible fin **83** is formed along the bottom of the exterior leg **73** for sealing against the exterior sill **21** of the assembly, a flexible fin **84** is formed along the bottom of the interior leg **74** for sealing against the interior edge of the assembly, and a flexible fin **82** is formed along the support surface **72** of the cap for sealing against the bottom of a sidelight panel **81** supported atop the sidelight cap. Seals may also be provided at other locations if desired according to needs of a particular application.

With the just described configuration, it will be seen that the sidelight cap of the assembly "snaps" into place on the body with its exterior and interior tabs **76** and **77** extending into the exterior and interior grooves of the threshold body. Further, and of key significance, the sidelight cap **71** can be mounted on the body **12** at any desired location therealong or can be snapped into place and slid longitudinally to a desired location. The sidelight cap is therefore selectively positionable and infinitely adjustable along the length of the threshold body. In this way, a standard threshold assembly of this invention can be adapted for use with a right or left sidelight entryway, a double sidelight entryway, or any size and configuration of patio door entryway as required. In addition, since the sidelight cap is made of extruded plastic, it can easily be cut by a contractor or entryway manufacturer to any length required to accommodate the width of a sidelight panel. Finally, the fact that the threshold cap rests atop the body of the threshold assembly covering the threshold portion thereof allows the threshold assembly of this invention to be continuous; that is, to extend continuously beneath the door and sidelight panels of an entryway system. As mentioned above this feature greatly reduces manufacturing time and cost and substantially reduces leakage common with prior art box construction techniques.

FIG. **4** is an enlarged cross-section of a portion of the support surface **72** of the sidelight cap **71**. The body of the support surface **72** is formed of extruded plastic material and a co-extruded skin **79** is formed on the outer surface of at least a portion of the support surface. Since the skin **79** is co-extruded with the body of the support surface, it is bonded thereto and forms a monolithic part of the body. Preferably, the skin is made of a lower durometer plastic material than the body and includes an upstanding flexible fin **82** for sealing against the bottom of a sidelight panel resting on the sidelight cap **71**. As discussed above relative to FIG. **3**, such a skin and integral sealing fins are provided elsewhere on the cap as well and may be provided anywhere on the cap where a seal is needed. Thus, the particular configuration and placement of the lower durometer skin and sealing fins illustrated in the figures should be considered exemplary only and are presented to represent the best mode known to the inventors of carrying out the invention. Many other configurations are possible, including no skin or fins, and all such configurations should be considered to be within the scope of the invention.